

REMARKS

New claim 22 has been added as a product-by-process claim including the recitations of claims 1, 9 and 10, and recitations based on the disclosure in the last full paragraph on page 14 in the specification. Withdrawn claims 9 and 10 have also been amended to include recitations based on the disclosure in the last full paragraph on page 14 in the specification.

Entry of the above amendment is respectfully requested.

Art Rejection over JP '822

On page 3 of the Office Action, in paragraph 9, claims 1-8, 17 and 18 rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over JP 2002-209822 (JP'822).

Applicants respectfully submit that the present invention is neither anticipated by nor obvious over JP'822, and request that the Examiner reconsider and withdraw this rejection in view of the following remarks.

1. JP'822 discloses a polymetaphenylene isophthalamide based polymer porous film having many uniform micropores in its front face and the interior in its claim 1. Further, JP'822 discloses that the porous film has a porosity between 40-90%, an open area of 10-70% on the front face, and a mean pore size of 0.5-20 μm on the front face in its claims 1 and 2. However, JP'822 is completely silent about the properties of the surface which is contacted to a support. The open area and the mean pore size of the porous film in JP'822 means those of one surface which is not in contact with a support. Thus, JP'822 does not disclose the elements (2) an open area of two surfaces, (3)a difference in the open areas of two surfaces, and (4) a mean pore size

of two surfaces of present claim 1. These elements (2), (3) and (4) are attributed to the process for producing the porous film.

2. There are two methods to obtain the porous film of the present invention having the above elements (2), (3) and (4).

(A) Method 1

This method 1 corresponds claim 9 and examples 4-8 in Table 1. This method 1 has two characteristic conditions together: (I) a polymer solution containing an amide solvent and at least one compound selected from groups of a polyhydric alcohol substance and/or a C5-19 hydrocarbon which is soluble in an amide coagulating solution; and (II) temperature of the amide coagulating solution being between -20 °C and +25 °C. It is very important that combining the above two conditions (I) and (II), to obtain the porous film of the present invention having the above elements (2) (3) and (4).

(B) Method 2

This method 2 corresponds claim 10 and examples 1-3 in Table 1. This method 2 has two characteristic conditions together: (I) the support surface is subjected to rubbing treatment before the polymer solution is cast onto the support; and (II) temperature of the amide coagulating solution being between -20 °C and +25 °C. It is very important that combining the above two conditions (I) and (II), to obtain the porous film of the present invention having the above elements (2), (3) and (4).

3. Next, Applicants wish to explain about the reason why it is possible to obtain the porous film of the present invention having above elements (2), (3) and (4) by the above two

Methods 1 and 2. Usually a porous film made by a casting method and using a coagulating bath has a difference between one surface from another surface in their open areas and means pore size. When a casting film is dipped into a coagulating bath, at first coagulating solution meets one surface which is not contacted to a support and then slowly seeps and reaches the other side of the film which is contacted to a support. Such time lag causes a difference in their property of the two faces. However, the present inventors found that it is possible to obtain the porous film having approximately same property of the two faces, by controlling the above conditions (I) and (II) of Methods 1 and 2. That is, by adding at least one compound selected from groups of a polyhydric alcohol substance and/or a C5-19 hydrocarbon which is soluble in an amide coagulating solution into the polymer solution, it is possible to control the properties of two surfaces homogeneously. By rubbing treatment to the support surface, it is also possible to control the properties of two surfaces homogeneously. Further, by controlling the temperature of the amide coagulating solution being between -20 °C and +25 °C, the speed of forming pores between one side and the other side of the film would be generally same. This can be easily understood from Table 1 in the present application.

4. On the other hand, JP'822 discloses process for producing the porous film having following steps (i) to (iv) in order in its paragraphs 0010-0022.

(i) a casting step of casting a polymer solution onto a support, wherein the polymer solution contains poly(metaphenylene isophthalamide) and an amide solvent,

(ii) a dipping coagulation step wherein the cast solution layer is dipped in an amide coagulating solution containing a substance which is non-compatible with poly(metaphenylene isophthalamide) for coagulation of the cast solution layer,

(iii) a washing and releasing step wherein the coagulated layer obtained in the previous step is washed and released, or released while washing from the support, and

(iv) a heat treatment step wherein the washed and released coagulated layer is heat treated.

5. However, JP'822 does not disclose the above two conditions (I) and (II) of Methods 1 and 2 of present invention. Thus, it is impossible for the porous film of JP'822 to have the same properties between two surfaces.

6. Accordingly, the porous film of JP'822 does not have the above elements (2), (3) and (4) of present claim 1.

Thus, Applicants submit that the present invention is patentable over JP'822, and withdrawal of this rejection is respectfully requested.

Art Rejection over WO 01/19906

On page 4 of the Office Action, in paragraph 10, claims 1-8, 17 and 18 rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over WO 01/19906 (Ohno).

Applicants respectfully submit that the present invention is neither anticipated by nor obvious over Ohno, and request that the Examiner reconsider and withdraw this rejection in view of the following remarks.

1. Ohno discloses a polymetaphenylene isophthalamide based polymer porous film having a porosity between 60-80% in its claims 1 and 2. However, Ohno is completely silent about the elements (2), (3) and (4) of present claim 1. As discussed previously, these elements (2), (3) and (4) are attributed to the process for producing the porous film.

2. Specifically, Ohno discloses a process for producing the porous film having the following steps (i) to (iv) in order in paragraphs 0026-0047 of US2004/0161598.

- (i) a casting step of casting a polymer solution onto a support, wherein the polymer solution contains poly(metaphenylene isophthalamide) and an amide solvent,
- (ii) a dipping coagulation step wherein the cast solution layer is dipped in an amide coagulating solution containing a substance which is non-compatible with poly(metaphenylene isophthalamide) for coagulation of the cast solution layer,
- (iii) a washing and releasing step wherein the coagulated layer obtained in the previous step is washed and released, or released while washing from the support, and
- (iv) a heat treatment step wherein the washed and released coagulated layer is heat treated.

3. However, Ohno does not disclose the above two conditions (I) and (II) of Methods 1 and 2 of the present invention. Thus, it is impossible for the porous film of Ohno to have the same properties between two surfaces.

4. Accordingly, the porous film of Ohno does not have the above elements (2), (3) and (4) of present claim 1.

Thus, Applicants submit that the present invention is patentable over Ohno, and withdrawal of this rejection is respectfully requested.

Conclusion

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

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